St. Petersburg State University
Graduate School of Management
Master in Corporate Finance Program

IMPACT OF CAPITAL STRUCTURE ON FIRM PERFORMANCE: EVIDENCE FROM RUSSIAN COMPANIES

Master's Thesis by the 2nd year student
Concentration – Master in Corporate Finance
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St. Petersburg
2017

ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

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АННОТАЦИЯ

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Факультет	Высшая Школа Менеджмента
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Год	2017
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Описание цели, задач и основных результатов	Цель работы: исследовать влияние структуры капитала на финансовые показатели на примере Российских компаний. Задачи: изучить теоретические основы структуры капитала; проанализировать исследования по влиянию структуры капитала на финансовые показатели компаний; собрать данные и провести эмпирическое исследование; интерпретировать результаты и предложить управленческие рекомендации. Результаты: изучена теория по структуре капитала; проанализированы исследования по влиянию структуры капитала на финансовые показатели компаний; собраны данные по 135 Российским публичным компаниям за период 2010 – 2015 и проведен регрессионный анализ; результаты исследования интерпретированы и обсуждены, на их основе предложены управленческие рекомендации; ограничения по использованию результатов выявлены, а также представлены направления для будущего исследования.
Ключевые слова	Структура капитала, левередж, финансовые показатели, финансовые результаты

ABSTRACT

Master Student's Name	Leonid Karpukhin
Master Thesis Title	«Impact of capital structure on firm performance: evidence from Russian companies»
Faculty	Graduate School of Management
Main field of study	080200 “Management” (specialization: Master of Corporate Finance)
Year	2017
Academic Advisor’s Name	Egor D. Nikulin, Associate Professor
Description of the goal, task and main results	Research goal of the paper is to determine the relationship between capital structure and firm financial performance, using evidence of Russian companies. In order to achieve this goal we set the following objectives: • To identify theoretical background on capital structure; • To analyze theoretical and recent empirical studies on capital structure – financial performance relationship; • To conduct an empirical study on the built sample of Russian public companies; • To analyze the results and provide managerial implications based on the findings; • To outline limitations and provide suggestions for further research. Results: theoretical background on capital structure is studies; theoretical and recent empirical studies on capital structure – financial performance relationship are analyzed; empirical study on 135 Russian public companies is conducted; obtained results are interpreted and managerial recommendations are provided; limitations for the study are outlined and suggestions for further research are given.
Keywords	Capital structure, leverage, financial performance, financial results

TABLE OF CONTENTS

INTRODUCTION

While the role of finance function to success of a firm has been evident for a long period, capital structure decisions are in the heart of that. In today's globalized and increasingly changing world where severe competition puts pressure on companies in all industries, making right capital structure decisions not only influence preformance of a company, but are imperative to its survival.

Though capital structure has been one of the central topics in finance theory since fundamental paper of Modigliani and Miller in 1958, there is still no clear consensus neither between scholars, nor between practitioners. While some researchers emphasize the benefits of debt, such as tax shield and instrument of discipline for managers, others argue that it not only increases the likelihood of default, but eventually destroys value. What both sides undoubtedly agree on is the crucial role of capital structure decisions to any firm.

Despite being an old topic to academic world, most of the studies are primarily devoted to capital structure optimization – finding the point, which maximizes the value of a firm. Only with some later studies have the scholars found that value is directly affected by performance and, therefore, this relationship should also be investigated. Though more than half a century has passed, there are opposing empirical results on the type of direction of relationship between leverage and performance. It creates a very clear research gap to be fullfiled by our study.

Emerging markets, including The BRICS club (Brazil, Russia, India, China and South Africa) have been one the primary driving powers for the global economy in the last decade, reaching more than 30% of global GDP in 2015, according to The World Bank. Yet, there has been lack of emphasiz on analysis of capital structure – performance relationship in recent papers and not a single one devoted to Russia – this is another fundamental reason for conducting our research.

The research goal of the paper is to determine the relationship between capital structure and firm financial performance, using evidence of Russian public companies.

In order to achieve this goal we set the following *objectives*:

- To identify theoretical background on capital structure;
- To analyze theoretical and recent empirical studies on capital structure – financial performance relationship;
- To conduct an empirical study on the built sample of Russian public companies;
- To analyze the results and provide managerial implications based on the findings;
- To outline limitations and provide suggestions for further research.

As far as we use empirical analysis in order to achieve the goal of the study, we conduct econometric analysis with the help of Stata software.

There is a wide range of sources that we use in order to achieve the goal, including academic papers, professional periodical literature, annual reports of the companies which comprise the sample chosen for the study. In order to gather data for empiracal part of the study we use Thomson Reuters Eikon database.

The thesis is structured in the following way: introduction, followed by three chapters covering theoretical, methodological and empirical parts of the research and a conclusion, which summarizes the findings.

The first chapter familiarizes the reader with the topic: it gives basic definitions, outlines findings of literature and summarizes metrics used by different scholars to evaluate capital structure – financial performance relationship. Apart from that, we also try to investigate the major determinants of capital structure decisions for Russian public companies.

The second chapter is devoted to describing methodological approach that we use in the study. It starts with developing a number of research hypotheses, followed by models that we employ and tests we use in order to choose the best fitting estimators. Finally, we build a sample using a set of characteristics and briefly describe the obtained data.

The third chapter includes outline of the findings of regression analysis and provides managerial implications of the obtained results along with limitations for their extrapolation.

Apart from the main part, each of the three chapters is followed by short summary which synthesizes their main findings.

CHAPTER 1. THEORETICAL BACKGROUND AND LITERATURE REVIEW

1.1 Theoretical background on capital structure

All corporate finance functions can be divided into two groups: 1. Investment decisions; 2. Financial policy decisions. While the first group includes questions on whether or not invest in a company or a project, the second deals with financial forecasting, financial policy and payout policy. Combination of these two functions reveals the goal of any company – value maximization through investing in projects and making decisions about sources of funds. Capital structure is the central issue of the second group of functions. CFOs consider it to be the most valuable finance function to the company (Deustche Bank, 2006).

The central idea of capital structure decisions is to «choose a financing mix that minimizes the hurdle rate and matches the assets being financed» (Damodaran, 2001). From the definition we can see that in order to maximize the value, a firm, which is a sum of debt and equity, needs to balance its components.

Debt capital

Debt capital obviously has both – benefits and drawbaks. *On the one hand*, it enables companies accelerate growth, enter new markets, invest in new projects. One of major benefits is tax deductability, known as *tax shield*, which arises when a company employs debt to finance its needs. What is more, debt is usually considered a cheaper source of financing in comparison with equity. *On the other hand*, debt possesses a number of risks. First of all, it increases probability of financial distress. Thus, as far as shareholders have to carry additional risks, they consequently require a higher return. Moreover, if a company uses its shares as a collateral for debt, there is a risk of losing control (insolvency), which, again, is translated into higher return expectations of existing shareholders. In general, cost of debt can be calculated in the following way:

$$k_d = r_d(1 - t)\,, (1.1)$$

where:

k_d – cost of debt

r_d – borrowing rate

t – tax rate

Cost of debt depends on 3 components (Damodaran, 2001):

- Level of interest rates
- Default premium
- Tax rate

Equity capital

Equity, as noted earlier, represents second component of firm's capital mix. Just like debt, it has its pros and cons. *On the one hand*, equity is more expensive than debt and its cost is even higher in case of low borrowing rates. Moreover, it can be said that equity financing in its nature is a more strategic source of financing, because it is both time- and money–consuming to organize share issue. Futhermore, a company cannot benefit from tax deductability. *On the other hand*, equity does not require a company to make interest payments as it happens in case of debt financing. Therefore, shareholders do not need to worry about costs, associated with potential inability to repay debt. In general, cost of equity can be calculated in the following way:

$$k_e = r_f + \beta(r_m - r_f), (1.2)$$

where:

k_e – cost of equity

r_f – risk–free rate

β – unsystematic risk

r_m – market return

Total capital

Total capital of a company usually consists of a combination of both – debt capital and equity capital. As it was noted before, managers try to balance share of debt and equity by weighing costs and benefits, associated with each type of financing. Thus, they form a mix, which is then used to make investment decisions, Weighted Average Cost of Capital (WACC), also known as hurdle rate. Thus, firm's cost of capital can be calculated as following:

$$WACC = r_d \frac{Debt}{Debt + Equity}(1 - t) + r_e \frac{Equity}{Debt + Equity}, (1.3)$$

where:

$WACC$ – weighted average cost of capital

r_d – cost of debt

$Debt$ – amount of debt in capital structure of a firm

$Equity$ – amount of equity in capital structure of a firm

t – tax rate

r_e – cost of equity

1.2 Literature review

Most of theoretical («classical») theories are devoted to finding an optimal mix of debt and equity (some of them assume that such a point does not exist). However, as far as our paper is not concerned with optimality problem, during analysis of the papers we will synthesize their main findings and show how they adress the main objective of the study – relationship between capital structure and firm performance.

1.2.1 Theoretical studies

Modigliani and Miller theorem

The fundament of capital structure theory was laid by Nobel prize winners Franco Modigliani and Merton H. Miller, denoted by M&M in this paper. In their revolutionary article «The Cost of Capital, Corporation Finance and the Theory of Investment» (Modigliani, Miller, 1958) they show that firm value does not depend on the capital structure decisions. It is critical to mention that this work was based on a number of undelying assumptions, which do not hold in real world. Nevertheless, M&M can be considered a starting point in the development of capital structure theory and it influenced the whole world of corporate finance.

M&M without taxes

As it is previously mentioned, proof of initial M&M theorem (Modigliani, Miller, 1958) is based on a number of underlying assumptions, which are as following:

- No taxation
- No transaction costs
- No information asymmetry
- Debt is risk-free

Based on these assumptions, the authors manage to develop two propositions**:**

Proposition I

$$V_U = V_L \,, (1.4)$$

where:

V_U – value of an unlevered firm

V_L – value of levered firm

According to the first proposition in the above equation, the value of the firm is indendent of mix of debt and equity.

Proposition II

$$r_E = r_0 + \frac{D}{E}(r_0 - r_D), (1.5)$$

where:

r_E – cost of levered equity

r_0 – cost of unlevered equity

r_D – cost of debt

D – amount of debt

E – amount of equity

According to the 2nd M&M proposition in the above equation, we can see that cost of equity grows linearly with the increase of debt in the capital structure of a firm. The essence of M&M is that violation of its basic assumptions is what makes it important – it indicates where to look when making decisions on capital structure.

- Thus, by applying M&M concept to the objective of the paper, we can infer that capital structure **does not influence** firm performance.

M&M with taxes

Development of capital structure theory led to modification of initial M&M, this theory is denoted by M&M II in this paper. This evolution became possible by violating one of the assumptions – absence of taxes. According to M&M II (Modigliani, Miller, 1963), a company can increase its value by increasing proportion of debt in its capital structure, because it enables it to use benefits of tax shield. Based on the new assumption, the following two propositions were developed:

Proposition I

$$V_L = V_U + tD\ , (1.6)$$

where:

V_L – value of levered firm

V_U – value of unlevered firm

t – tax rate

D – amount of debt

According to 1st proposition of M&M II in the above equation, the value of the firm increases with the increase of debt in the capital structure. Thus, in order to maximize the value, the company should have 100% debt level.

Proposition II

$$r_E = r_0 + \frac{D}{E}(r_0 - r_D)(1 - t), (1.7)$$

where:

V_L – value of levered firm

V_U – value of unlevered firm

t – tax rate

D – amount of debt

E – amount of equity

According to 2nd proposition of M&M II in the above equation, the higher the proportion of debt in capital structure of the firm, the lower is its WACC. Thus, again, in order to maximize the value, the company should have 100% debt level.

- Thus, applying M&M concept to the objective of the paper, we can infer that leverage has a **positive impact** on firm performance.

Trade-off theory

Despite its impact on development of capital structure theory, M&M's major drawback is that none of its assumptions hold in real world. The main imperfection of M&M II is that it predicts every company to have the highest possible leverage, disregarding its negative effect. However, in real world debt cannot be considered risk-free, thus, by having more debt in capital structure firm's risk of not repaying the debt increases.

Awareness of this concept led to development of next concept, known as trade-off theory. According to the theory proposed by Kraus and Litzenberger (1973), in order to find optimal capital structure a company has to balance benefits of tax saving from holding debt against cost of financial distress (CFD). The concept can be better understood in marginal terms: higher debt leads to slower growth (or decline) of its marginal benefit to the company, while marginal costs, on the other hand, tend to increase. Thus, by weighing benefits agains costs, an optimal D/E ratio can be found.

Thus, the trade-off theory modifies M&M firm's value equation by adding CFD, and it can be expressed as following:

$$V_L = V_U + tD - CFD, (1.8)$$

where:

V_L – value of levered firm
V_U – value of unlevered firm
t – tax rate
D – amount of debt
CFD – cost of financial distress

Applications of trade-off theory can be found in many other studies. *Thus,* Nevins D. Baxter (1967) claims that even though it is complex to distinguish between fraction of impact which is attribute to CFD and other factors, higher leverage (thus, CFD) has a negative impact on operating profit of a company. Fama and Miller (1972) and Scott (1977) show that benefits of tax deductability can be limited because of bankruptcy risk and other associated costs, which could negatively effect firm performance. According to Myers (1984), firms balance interest tax shield and bankruptcy costs and gradually move towards optimal point (adjusting it in case of unexpected costs).

On the other hand, there are studies which indicate lower impact of leverage on financial performance. By analyzing railroad companies, Martin J. Gruber and Jerold B. Warner (1977) found that direct bankruptcy costs are much lower than they are commonly thought to be. However, as far as the analysis is related to only one industry, it is hard to extrapolate results to other industries. Another paper, writter by Weiss (1990) also found low direct costs of bankruptcy by assessing 37 NYSE and AMEX companies. However, usefulness of this paper can also be limited because of small size of analyzed sample.

- Despite mixed results of research of different authors, it can be inferred, that higher leverage, though needs to be weighed against bankruptcy costs (both direct and indirect), is **positively correlated** with firm performance.

Agency Costs theory

According to Jensen and Meckling (1976), an **agency relationship** is «a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent». In broader and more simple terms it can be said that agency costs arise in presence of conflict of interests, which nowadays can be found in virtually all companies.

While each of the involved parties is intended to maximize value of the firm, it is not always the case. Thus, managers, stockholders and debtholders can have different interests, which consequently lead to lower efficiency. This inefficiencies could be solved by *capital structure decisions:*

- Increase of debt in capital could solve the problem of overinvestment by managers, but has a downside of potential loss of underinvestment, caused by not having enough financial resources.
- Equity financing reduces underinvestment, while raises the number of overinvestments.

Jensen (1986) shows evidence from LBO deals and takeovers in oil industry that higher debt has indeed negative effect on financial performance of a company. By cutting their free cash flows, firms motivate their managers to use money efficiently, rather than wasting it. Myers (1977) argues

for the existence of agency costs. According to the author, managers intend to maximize value of equity, instead of maximizing value of the whole company (debt+equity). They (managers) have to give up value-creating (NPV>0) projects because of existing risky debt, thus, underinvest. It illustrates negative effect of higher leverage on performance (and value) of a firm, which is known as «debt overhang». Stulz (1990) analyzes how capital structure decisions can be used to reduce agency costs, incurred by presence of «informational assymetry» (managers possess more information than shareholders). Based on the analysis, more volatile cash flows have significant impact on firm performance, because they increase amount of both over- and underinvestments. In order to make cash flows more predictable and reduce agency costs, associated with managerial decisions, firm has to diversify across many projects. Hence, the author makes a conclusion that in case of information assymetry capital structure negatively impacts financial performance.

- Thus, according to the agency costs theory, it can be inferred that higher debt-to-equity ratio leads to **lower performance** of a firm.

Signaling theory

Another family of theories was also developed on the concept of assymetric information. In fact, as some of the researchers found out, investors' opinion about prospects of a company, which is then translated into its share price, depends on its capital structure decisions. Thus, Ross (1977), based on Akerlof's (1970) «lemons and peaches» logic, proposed that the choice of source of financing depends on firm's managers' knowledge about company's prospects. Suchwise, if a company attracts debt, it commits itself to future payments, which it will only be able to pay in case of good conditions and thus it can be considered a good «signal». On the other hand, if a company issues equity, it either tells about its inability to attract another source of financing or its managers possess (negative) information, which is not yet reflected in the share price, which they consider overvalued – either way it should act as a bad «signal» for potential investors. Leland and Pyle's theory (1977), which can be thought of as a modification of «signaling», obtained similar results by analyzing capital structure during IPO valuation. Thus, they say, if the prospects of a company are good, shareholders do not want to dillute their shares and get lower «pie» of a value-creating deal. Hence, on the contrary, if a company is taking debt, it can serve as a signal of good prospects of the company.

- To sum up, it can be said that in case of signaling theory we can conclude that financial performance has a **positive affect** on leverage of a firm.

Pecking Order theory

Unlike most of the previous researchers on corporate structure, Donaldson (1961) does not say there is a unique combination of debt and equity. Instead, he argues that a company has a defined preference order of sources of financing. Thus, successful and, therefore, profitable firms, tend to

borrow less, because they have enough resources to finance projects with retained earnings. When the first instance is no longer available, the firm should look for external financing, which might be either corporate bonds or bank loans. Lastly, the final source is issuance of new equity, which should only be used when both retained earnings and debt capacity are exhausted.

Futher development of initial theory revealed new evidence in favor of financing hierarchy. Thus, Myers and Majluf (1984) apply effect of information assymetry on security misprising. According to their theory, investors perceive managers to have better knowledge about crucial to success of the company information. Therefore, firms, acting to maximize value of existing shareholders, issues new securities only when they are thought to be overpriced. In order to avoid costs associated with perception of investors, companies try to fulfill their financial needs with retained profit, followed by debt as the second priority choice of financing and equity issue at the last preference.

On the other hand, there are papers, which argue against pecking order theory. Suchwise, Fama and French (2005) argue that Myers (1984) bases his model on aggregate data, which leads to lower ratio of new equity issue to debt. However, as it turns out, firms in fact issue equity and the proportion of those who do increases – from 67% (on average) for 1973 – 1982 to 86% for 1993 – 2002 period. The proof of violation is even strengthened by the fact that most of those companies were not scarce of opportunities to use different source of financing, such as debt.

- Thus, it can be inferred that there is a **negative relationship** between debt and performance. In fact, performance is what determines the amount of debt that a firm can have in its capital structure mix.

Market Timing theory

One of the earliest papers, which adressed the essence of time in capital structure decisions was that of Taggart (1977). According to the author, companies' decision on attracting debt or equity financing is based on their capacity for long term debt, which is based on the existing debt-to-equity ratio. Marsh (1982) also showed that choice of source financing depends on two conditions:

1. Current market conditions
2. Past history of share price movements

Baker and Wurgler (2002) are among the researchers who contributed to widespread of market timing theory. By analyzing companies in the US, they find a strong correlation between current capital structure and firm's valuation. Thus, when companies observe high ratio of market share value to its previous value and its book value, they can decrease leverage by issuing new equity. Therefore, when firm managers have high expectations about future prospects, they take advantage of this situation on equity market. Hence, if performance of a company is high (expected to be

high), companies tend to have lower debt-to-equity ratios. According to the later theory of Welch (2004), firms adjust their capital structure based on previous stock prices, which are strongly correlated with financial performance. Thus, the better the performance, the more the company is intended to issue additional shares and, therefore, decrease its leverage.

- Based on market timing theory, we can conclude that performance of a company influences its willingness to issues additional shares. Thereby, there is a **negative relationship** between financial leverage and firm performance.

To sum up, there is no consensus on type of relationship between capital structure and firm financial performance among «classical» theories of capital structure. What is more, according to results of some papers, root cause of impact can also differ – some show that leverage affects companies' performance, while others argue in favor of reverse logic. Results of analyzed capital structure theories are summarized in a table below (refer Table 1.1).

Table 1.1 Results of capital structure theories

Theory	Causality	Relationship
Modigliani and Miller (1958)	No	No
Modigliani and Miller (1963)	Direct	Positive
Trade-off (1973)	Reverse	Positive
Agency Costs (1976)	Direct	Negative
Signaling (1977)	Reverse	Positive
Pecking Order (1984)	Reverse	Negative
Market Timing (2002)	Reverse	Negative

1.2.2 Empirical studies

Despite their scientific importance and contribution to development of capital structure theory, «classical» studies, which we analyze before, do not directly address the main objectives of this study. As we have seen (refer Table 1.1), there are findings about different types of relationship between leverage and financial performance of a firm. What is more, some of them suggest that capital structure has an impact on perfromance, while others argue that it is performance that determines the mix of debt and equity. For the purpose of this study we are going to use leverage as a major independent variable. In this part of the chapter we present some of recent studies, which were specifically designed to evaluate relationship between capital structure and financial performance. As we show, researchers get different results from their analysis. Thus, we decided to combine them into 3 groups – first group includes studies which predict no significant relationship between capital structure and firm performance, the second one finds evidence of

positive relationship, while the third, on the contrary, negative relationship between leverage and financial performance.

No Relationship

Empirical study of Ebaid (2009) presents one of few studies devoted to emerging (transition) economies. The author decides to use exclusively accounting-based ratios, namely ROA, ROE and gross margin (GM) in order to evaluate a pool of 64 companies that listed on Egyptian stock market. Results of the study indicate that even though there is a weak negative relationship between leverage (STD) and ROA, all leverage ratios (STD, LTD,TD) have no signifficant affect on both ROE and GM. Nevertheless, it seems that accuracy of results could be impoved by including control variables such as growth, size, etc (which showed out to be signifficant in other papers) and increasing size of a sample.

Yazdanfar & Öhman (2015) analyze a huge sample of cross-sectional data, which consists of almost 16'000 Swedish small and medium-sized enterprises (SMEs) from 5 sectors of economy. Similarly to most of other researchers in applying fixed-effects model, approach of this study is indeed distinct from others, as it uses three-stage least squares (3SLS) technique. The authors take ROA as a single indicator of profitability (performance), while consider multiple explanatory variables as measures of financial leverage, including STD, LTD and A/P. According to findings of authors, there is no significant impact of debt ratio on firm performances. Nevertheless, results of the study cannot be completely relaible due to short period of collected data and single measure of performance as dependent variable of regression.

Positive Relationship

Dessi and Robertson (2003) argue that robustness and reliability of most of previous studies is limited due to the fact that they don't account for endogenity and dynamic nature of capital structure decisions. Dessi and Robertson suggest that by utilizing panel data techniques for a large data set (1635 compamies) over a long period (1967-1989) and using larger number of lags for some variables (if required), they manage to explicitely account for endogenity problem. Their findings suggest that higher leverage leads to growth in performance, measured by Tobin's Q and this effect is signifficant for static framework. Thus, researchers not only detect and address research gap in existing literature, but also create space for future studies – studying dynamic relationship between leverage and financial performance.

Abor (2005) utilizes odrinary least squares (OLS) technique to examine relationnship between capital structure and performance of Ghanian public companies. His sample consists of panel data on 22 companies over a five-year period from 1998 to 2002. In order to measure leverage the researcher uses 3 accounting-based ratios, namely short- and longterm debt to total capital, as well as total debt to total capital. As a measure of performance, he chose return on equity (ROE), which

is calculated as earnings before interest and taxes (EBIT) divided by equity. Apart from these ratios, the author includes two other variables – size of a firm and sales growth – in order to control for bias they could bring into results of regression. According to the study, there is a positive significant relationship between short-term and total debt and ROE. However, it is critical to note that due to small size of analyzed sample, results should be treated with caution. What is more, scope of the paper is limited, as far as Ghanian stock market includes some country-specific characteristics, which also need to be taken into account when interpreting results.

Another study, predicting positive relationship between leverage and performance, is written by Berger & Di Patti (2006). In their study researchers are focused on testing agency cost theory (which predicts positive relationship) on a sample consisting of 695 banks. What distinguishes this paper from others is its innovative method – the authors apply «profit efficiency» as an indicator to measure firm performance. Moreover, researchers use advanced two-stage least squares estimation technique to estimate two-equation structural model, which enables them to evaluate reverse causality. As a result, researchers' conclusions are consistent with agency cost theory prediction – higher leverage has a positive effect on firm performance. This applied paper creates a solid background, which could be extended to analyze other industries.

Margaritis and Psillaki (2010) investigate effect of capital structure, ownership structure and performance on a sample of both high-growth (Information Tehcnologies, computers) and mature (chemicals, textiles) industries from France. They use cross-sectional model on data collected from 2002 to 2005. In order to test the effect of leverage on firm performance, researchers apply directional distance function (DDF) approach and measure firm efficiency (performance) as a distance of that «best practice» frontier. As a result, authors make a conclusion that across the entire set of industries and throughout the whole analyzed period, there is a positive relationship between leverage and firm performance. Even though results are consistent, authors eliminate risk of incomparability by analyzing data based on its industry-specific context. However, utilization of «efficiency» approach as an alternative to financial performance indicators needs to be further investigated.

Gill, Biger and Mathur (2011) argue that most of previous studies examining relationship between capital structure and companies' performance are addressed to analysis of manufacturing companies. Thus, taking into account differences between nature of businesses, their results cannot be extrapolated to service companies and there exists a potential research gap. In their work they test a sample of 272 service firms, listed on New York Stock Exchange (NYSE) and find a strong evidence of positive impact of leverage (both short- and longterm debt to total capital) on performance, measured as ROE. Although the paper addresses a problem of differencies between industries (which is its main motivation), there seems to be a major flow in methodology – it is

not clear why ROE was chosen to be (the only) measure of firm performance. Therefore, it can be said that utilization of a larger number of performance indicators could (potentially) improve reliability of obtained results.

Negative Relationship

Gleason, Mathur and Mathur (2000) belong to a group of researchers who try to test agency cost theory of capital structure. Authors examine impact of leverage on performance on a sample of 198 European retailers from 14 countries. To tackle the problem of comparability, which could arise due to cultural differences, the authors group the companies in 4 clusters. Despite the fact that capital structure indeed differs between clusters (which was proven with a hypothesis test), results of regression for all clusters turn out to be identical. Researchers show that agency problem is the main reason that a firm becomes overleveraged, which, as a consequence, leads to a lower performance, measured both by financial and operational ratios. While analyzing companies within one specific industry, the paper successfully addresses problem of differencies between cultures in different countries (clusters of countries), which could ultimately influence firm performance. Despite the fact that researchers consider retail industry to be «fairly static», managerial applications based on this paper can be outdated, because research is based on data from 1994.

Similarly, Zeitun, Tian (2007) focused their efforts on investigating relationship between capital structure and corporate performance of Jordanian firms. Using unbalanced panel data collected over a 6 year period from 167 public companies, researchers apply random effects model. As a relust, financial leverage turns out to have negative relationship on both market (measured as Tobin's Q) and book (measured as ROA) performance measures. What distinguishes aproach of this study is that authors include in their model such variables as political stability and business risk, which turn out to be statistically significant determinants of capital structure decisions. Interestingly, firm size, which is used as one of control variables in regression, shows to have a positive impact on performance, meaning that larger firms have lower costs of financial distress.

Another evidence of negative effect of debt ratio on performance was found in Indian market. Thus, Ghosh (2008) analyzed a huge sample consisting of 1390 manufacturing firms collected over a period from 1995 to 2004. Author applies both book- and marketbased ratios to measure performance, while leverage is found by simply dividing company's debt by its total assets, which could be one of potential limitations for reliability of obtained results. Similarly to some of other studies, researcher includes control variables, in this case firm size and asset tangibility are considered most relevant. As a result of simple OLS regression, scholar comes to a conclusion, that performance is positively influenced by higher leverage, however, its marginal effect becomes lower after some point, as far as it is associated with a corresponding increase in risk of financial

distress. Summary of results of leverage – performance relationship in the analyzed empirical studies is presented in Table 1.2 below:

Table 1.2 Results of empirical studies

Author	Relationship
Dessi & Robertson (2003) Abor (2005) Berger & Di Patti (2006) Margaritis & Psilaki (2010) Gill, Biger, Mathur (2011)	Positive
Gleason, Mathur, Mathur (2000) Zeitun, Tian (2007) Ghosh (2008)	Negative
Ebaid (2009) Yazdanfar & Öhman (2015)	No

1.2.3 Firm characteristics as determinants of capital structure

Before we move to the final part of the first chapter, where we review commonly used measures of leverage and financial performance, we want to make a small step back and stress another issue which could be valuable for achieving the goal of the paper. We have just reviewed a number of studies devoted specifically to capital structure – financial performance relationship and it's still the major question of our paper. However, the problem which may rise when interpreting the result is very simple: are the analyzed companies operating in the same conditions? These moves us, again, one step back in our analysis in order to answer the following question: what are the characteristics of a firm, which determine the leverage? With this in mind, we in this subchapter we want to assess the literature and find what the main determinants of capital structure are. There are plenty of indicators which could be used in order to evaluate the relationship between firm characteristics, most common of which are the following:

- Tangibility;
- Non-debt tax shield;
- Profitability;
- Size;
- Expected growth;
- Uniqueness;
- Income variability;

However, for the purpose of our study, we decided to focus on three indicators: size, expected growth, state of economy

Size

Some of the earliest evidence of significant influence of firm size on its leverage is research published in The Journal of Finance Schwartz and Van Tassel (1950). According to their study, as far as costs associated with issuing debt securities compared to their size are much lower for big firms than for small ones, it favors them a lot. Thus, they are generally higher leveraged. What is more, small and medium enterprises (SMEs) are usually capable to finance their needs sufficiently from own funds, because they don't need to think of massive investments into entering new markets, producing new products etc.

Later, Titman and Wessels (1988) showed that higher level of diversification reduces the probability of firm's bankruptcy. Thus, as far as costs associated with potential financial distress are lower, these firms are more intended to have a higher debt ratio.

Based on data collected from more than 6000 Swedish firms, Son (2005) found evidence of significant positive relationship between companies' size, measured as natural logarithm of sales and leverage.

Later Karadeniz (2011) applied similar technique to investigate whether size affects leverage. As it turned out, it showed to be a significant factor for capital structure decisions for Turkish companies.

Expected Growth

We believe that growth could serve as one of the major factors influencing capital structure not only for Russian firms, but in many other countries across different industries. Companies which expect higher growth rates, are naturally willing to use this trend to generate higher sales and eventually increase their market. Thus, in order to grow faster they need to mobilize their financial resources and the most efficient way to do it, according to pecking order theory, is to attract debt financing. However, in order to track those expectations, we need to have a proper measure which would reflect them. To serve this function market – to book ratio is used as a proxy – it reflects investors' expectations about companies' growth prospects.

Michaelas et al (1999) were among the first scholars who assessed the growth – leverage relationship. Thus, based on the study conducted on small firms, their result are consistent with an expected perception – the relationship is positive. Interestingly, they use the ratio of R&D and patents to total assets as a measure of expected growth. According to their logic, if the ratio is higher, firms are said to commit themselves to long – term payments and, thus, expect to have sufficient cash – flows to cover the required debt payments. What is more, those firms which are growing faster than average ones, tend to have an even higher debt ratio and authors explaim it by the fact that those firms aren't sufficient with own capital and, therefore, seek for external (debt) financing.

Sobor – Mira's study (2005) of panel data of Spanish public firms argues in favor of a significant positive relationship between expected growth and leverage

By studying the sample consisting of all companies traded at NASDAQ, AMEX and NYSE collected over a period of 1971 – 2010, Ogden and Wu (2013) find evidence supporting significant positive causal relationship between expected growth, measured as Market – to – Book value and leverage.

State of Economy

We finally move to the final characteristic which could serve as a determinant of capital structure – state of economy. The rationale behind including this characteristic in our analysis is very simple: as far as Russian Federation has experienced a period of sanctions from Western countries since 2014, it significantly affected their capacity to attract debt due to limited access to foreign debt markets. Thus, we expect to observe a lower bebt ratio during 2014 – 2015 years in comparison to 2010 – 2013.

Iqbal et al (2015) analysed companies within a group of three countries, namely UK, Germany and France from pre-crisis (2006 and 2007) to crisis (2008 and 2009) years and the post-crisis (2010 and 2011) years. The result of their study is very insighful: firms with lower – than – average leverage ratio tend to attract more debt during crisis period, while those which had a higher – than – average ratio, on the contrary, decreased share of debt in the capital structure significantly.

According to another recent paper by World Bank (Demirguc-Kunt A. et al, 2015) there is a significant impact of state of crisis on capital structure across many countries. Thus, their result shows that there is a clear evidence of negative effect of crisis on leverage and findings are consistent both regionally – in developed and emerging markets, as well as across companies of different sizes and ownership structure.

1.3 Measures of leverage and financial performance

Having reviewed both theoretical and empirical papers in the previous part, it is clear that there is no consensus between the scholars on type of relationship between mix of debt and capital and financial performance of the firm. What is more, different measures of both leverage and performance are used. That being said, in this section we are going to describe various indicators used by researchers in literature.

1.3.1 Measures of leverage

Leverage is the main independent variable of our research. However, there is no clear reason for choosing one measure over another. One of the fundamental reasons explaining this fact is that companies use different types of financial resources for different needs. On the one hand, ***short – term debt*** is used for financing operational activites. This type of debt is mostly paid within 12

month (current fiscal year) and is represented in the current liabilities section on the balance sheet of the company.

On the contrary to short – term debt, ***long – term financing*** serves a strategic role for the company. It is used for financing capital expenditures and investment activity of the firm. What is more, by applying this source of financing, a company commits itself to future interest payments, which can act as a stimulating factor for managers to make disciplined investment decisions (Jensen, 1986).

Finally, the most basic gearing (leverage) measure is ***debt – to – assets ratio (***also known as ***debt ratio***). Generally speaking, this coefficient can be used as a comparative indicator for different companies' financial risk. Reference to the choice of leverage measures in the analyzed papers is represented in Table 1.3 below:

Table 1.3 Measures of leverage

Measure	Reference
Short – term debt to assets	Nirajini, Priya (2013); Gill, Biger and Mathur (2011); Abor (2005)
Long – term debt to assets	Joliet, Muller (2013); Al – Taani (2013); Iavorskyi (2013)
Total debt to assets	Iavorskyi (2013); Salim, Yadav (2012)

1.3.2 Measures of financial performance

Moving on to measures of financial performance, it can be said that there are even more varieties of indicators used by different researchers. In order to analyze measures in a structured manner, they can be combined into two groups, both which are used in academic as well as empirical studies that we analyzed in the previous section of the paper:

- Accounting – based measures;
- Market – based measures

Accounting – based measures are useful in evaluating companies' performance based on their books. On the one hand, it allows a researcher to analyze crucial to business profitability indicators, such as sales, net income, assets, equity etc. These measures include Return on Equity (ROE), Return on Assets (ROA), Earnings per Share and others. On the other hand, despite simplicity of calculation of accounting – based measures, their main drawback is that they are calculated using past information, limiting the possibility of forecasting.

According to Al-Matari (2014), ROA is the most popular measure of accounting – based performance and is used in almost 50% of the times, followed by ROE and ROS – these are all useful measures of how efficiently a company utilizes its resources to generate profit.

Moving to the market – based measures, they, on the contrary to accounting – based, are future – oriented. As far as their calculation requires usage of current market data, it is fair to say that investors' expectations about prospects of companies are already incorporated. Thus, these measures can represent a more accurate measure of financial performance.

Tobin's Q is undoubtedly the most widely used (78%, according to Al – Matari (2014)) market – based measure of financial performance, followed by Market – to book – Value and Price – To – Earnings ratio. However, as we have noted earlier, different authors prefer using various types of measures depending on goals of their research, and there is no concensus on which are better. In the Table 1.4 below we show, which measures are used by different scholars in their leverage – performance studies:

Table 1.4 Measures of financial performance

Measure	Reference
Tobin's Q	Khan (2012); San, Heng (2011); Zeitun, Tian (2007)
Market – to – book Value	Shah (2012); O`Connell and Cramer (2010)
Price – to – Earnings Ratio	Shah (2012); Valenti et al. (2011)

Summary of Chapter 1

In this chapter we start by defining concept and explaining essence of capital structure, pointing out main advantages and disadvantages of using different types of financing. We then move to analysis of most well – established theories of capital structure and show how they relate to the main objective of the paper. After that, we make a critical overview of modern empirical studies, highlighting their main findings and showing relevance and importance to achieving goals of our study.

The central idea of capital structure decisions is to «choose a financing mix that minimizes the hurdle rate and matches the assets being financed» (Damodaran, 2001). There are two types of financial sources: debt and equity, both of which have their benefits and drawbacks. Debt, on the one hand, can help a company grow faster by investing in new projects and entering new markets. What is more, by having debt in capital structure, companies can benefit from tax shield. On the other hand, there are many risks, among which are costs of financial distress and risk of losing control, to name a few. As far as equity financing is concerned, its main benefit is that there is no obligation to make interest payments as in case with debt. However, equity issue is usually both time- and money-consuming, which makes it more expensive in comparison with debt financing.

Reviewing theoretical studies, we note that there is no concensus on type of relationship between capital structure and firm's financial performance among «classical» theories of capital

structure. Moreover, according to results of some papers, root cause of impact can also differ – some show that leverage affects companies' performance, while others argue in favor of reverse logic.

Analysis of empirical studies shows that most of scholars find positive relationship between leverage and financial performance. However, there are some studies which find evidence in favor of opposite view or absence of such a relationship. Despite differencies in results, majority of researchers emphasize essence of using control variables, such as growth, size, and others, in order to obtain more reliable results.

What is more, different authors prefer using various types of measures of both leverage and financial performance, depending on goals of their research, and there is no concensus on which are more appropriate.

CHAPTER 2. RESEARCH DESIGN

This chapter is aimed to describe research design of the paper. Now that we have reviewed some of the most famous theoretical studies, as well as recent empirical papers devoted to capital structure – financial performance relationship, we are able turn to hypothesis development, which we formulate in the first part of this chapter. We then describe the methodology and develop the models that we are going to test the hypotheses. After that we move to choosing most appropriate variables that we use as independent (capital structure) and dependent (financial performance) measures as well as control variables, which aim to isolate potential biases. Finally, we describe our sample and provide comprehensive analysis of the data by summarizing descriptize statistics.

2.1 Hypotheses development

Before diving into the process of specification of hypotheses, it is crucial to describe the thought process behind it. To begin with, it's vital to point out two critical factors, which could significantly impact the result of the analysis:

1) Companies use different types of financing sources (short- and long-term) for different purposes (operational and strategic activities respectively);
2) Firms in various industries have different levels of indebtedness;

With this in mind, we are able to develop the first fundamental hypothesis of our research:

***H_1**: The relationship between debt ratio and company's financial performance is negative*

Taking into account factor 1) mentioned above, we decided to follow the approach of Iavorskyi (2013) and focus on long – term leverage. Thus, we are able to develop the next hypothesis:

***H_2**: The relationship between long – term debt and company's financial performance is negative*

Taking into account differences in business models and driving forces (factor 2) of different sectors, our initial intention was to group companies according to industry in which they operate. However, taking into account specifics of Russian stock market, due to the lack of sufficient number of firms in some industries (we describe it in the next part of this chapter) , we decided to divide the sample into two subsamples:

1) Light industry firms;
2) Heavy industry firms;

Thereby, it leads us to development of the next hypotheses:

***H_3**: The relationship between leverage and company's financial performance in heavy industries is negative*

***H_4**: The relationship between leverage and company's financial performance in light industries is negative*

Up to this moment we only talked about linear relationship between leverage and performance. However, according to Kraus and Litzenberger's (1973) trade – off theory, firms balance between different levels of leverage to maximize their value. Thus, we should also take into account the possibility of nonlinear model specification, which can be tested by our final hypothesis:

***H_5**: The relationship between leverage and company's financial performance is nonlinear*

Finally, as we point out in the previous chapter, apart from our major goal of investigating leverage – performance relationship we also try to analyze the major determinants of capital structure decisions for Russian companies. In order to address this issue, we state our final hypothesis as follows:

***H_{6a}**: The relationship between size and debt ratio is positive*

***H_{6b}**: The relationship between expected growth and debt ratio is positive*

***H_{6c}**: The relationship between state of economy and debt ratio is positive*

2.2 Methodology

There are four main types of data widely used in econometrics: cross – sectional, time – series, pooled and panel. It is evident that special tools are required to efficiently use each of the mentioned types of data and interpret gathered results of analysis. For the purpose of our study we are going to use panel data, which has a number of benefits in comparison to the others. First of all, by tracking same objects of analysis over time it is possible to observe certain charachteristics, which wouldn't be found otherwise. What is more, it may be valuable to observe those same units (in our case, firms) over a number of lags, because some chracteristics may only show up after some time (Wooldridge, 2015).

Now that we have chosen to use panel data, it is critical to stress that it can itself be further divided into two big groups: balanced and unbalanced. While balanced data contains analyzed characteristics of observed units in each certain time, the main feature of unbalanced data is omission of some observations. As far as the objects of our analysis are Russian *public* companies, which became public in different periods, it means that our panel data will be unbalanced. However, as far as this attrition is random, it will not negatively affect the estimatior, thus, we can still use unbalanced panel data (Wooldridge, 2015).

2.2.1 Models

As we notice earlier in this chapter, in order to efficiently use each type of data, special tools need to be applied. While panel data is not an exception, there are three main models (estimators) that we will employ: pooled OLS model, fixed effects model, random effects model**.**

The pooled OLS model

The intercept and the slope coefficients are constant across time and objects, and the error term captures differences over time and objects. In mathematical terms we can express the model in the following way:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it}\ , (2.1)$$

The fixed effects model

The slope coefficients are constant but the intercept varies over objects. Mathematically this model can be represented as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it}\ , (2.2)$$

The random effects model

The slope coefficients are constant but the intercept varies over objects and time. Thus, in the random effects model, the intercept itself becomes a random variable:

$$Y_{it} = \alpha_{it} + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it}\ , (2.3)$$

Having defined the conceptual part of methodology, we are now able to customize them specifically for our analysis and get the following models:

For accounting – based measures of performance:

$$ROA_{it} = \alpha_0 + \beta_1 Leverage_{total} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.4)$$

$$ROA_{it} = \alpha_0 + \beta_1 Leverage_{long-term} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.5)$$

$$ROE_{it} = \alpha_0 + \beta_1 Leverage_{total} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.6)$$

$$ROE_{it} = \alpha_0 + \beta_1 Leverage_{long-term} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.7)$$

For market – based measures of performance:

$$Tobin's\ Q_{it} = \alpha_0 + \beta_1 Leverage_{total} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.8)$$

$$Tobin's\ Q_{it} = \alpha_0 + \beta_1 Leverage_{long-term} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.9)$$

$$P/E\ ratio_{\ it} = \alpha_0 + \beta_1 Leverage_{total} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.10)$$

$$P/E\ ratio_{\ it} = \alpha_0 + \beta_1 Leverage_{long-term} + \beta_2 Growth + \beta_3 Size + \varepsilon_{it}\ , (2.11)$$

As we point our in previous chapter, in our analysis we differentiate between total and long – term leverage in order to address the differences in nature between them. Thus, in total we get eight separate models – four for each market – and accounting – based performance measures.

2.2.2 Tests

As far as the goal of our analysis is not to simply find the relationship between the two objects, but also to interpret results and make managerial implications, it is crucial to choose the model which would be the best fit for the analysis. Thus, we are going to use special tools – tests – to find the best model.

F-test

This test is used to find the preferred model between fixed effects and pooled OLS. F – test null hypothesis states that both observed and unobserved fixed effects are equal to zero. Thus, rejecting the null indicates the existance of significant fixed effect and, therefore, this model better fits for the analysis. (Greene, 2003)

$$H_0: \textit{Pooled OLS model}$$

$$H_1: \textit{Fixed effects model}$$

Breusch – Pagan LM test

If there is no significant presence of fixed effects found in our data, Breusch – Pagan test allows us to check whether there are random effects present. According to the null of the test, variance of the random effects is zero. Therefore, rejecting the null leads to the conclusion that random effects model is preferred to pooled OLS (Greene, 2003)

$$H_0: \textit{Pooled OLS model}$$

$$H_1: \textit{Random effects model}$$

Hausman test

Finally, there is a possibility that both random effects and fixed effects are present in the data and we have to choose which one is better. In order to do that, we apply Hausman test. Under the null of this test models errors are not correlated with regressors. Thus, rejecting the null hypothesis means that fixed effects model should be chosen (Greene, 2003)

$$H_0: \textit{Random effects model}$$

$$H_1: \textit{Fixed effects model}$$

2.3 Variables

Independent variables

Having developed a number of clear hypotheses in the previous chapter, we are now able to move to defining which measures are the most appropriate and useful to achieve the goal of the paper. As we have mentioned earlier, there is a big difference between various types of sources of financing – while long – term debt plays a strategic role for the company, short – term debt is primarily used for financing operational needs. Thus, for the purpose of our paper, we are going

to differentiate between total debt to assets (also known simply as debt ratio) and long – term debt to assets ratio, which are calculated respectively in the following way:

$$Total\ debt\ to\ assets = \frac{Total\ debt}{Total\ Assets}, (2.12)$$

$$Long - term\ debt\ to\ assets\ = \frac{Long - term\ debt}{Total\ Assets}, (2.13)$$

Dependent variables

As we point out in part 1.4 of this paper, there is a great variety of indicators, which are used in determining the leverage – performance relationship. All of measures fall into two big groups: accounting – based and market – based measures, both of which we are going to use in our study.

Starting with accounting – based measures, we are going to use two ratios, namely ROA and ROE, which indicate the efficiency of utilization of firm's assets and its equity respectively. As far as both of the measures are accounting – based, they can be easily calculated with the help of firms' books as follows:

$$ROA = \frac{Net\ Income}{Total\ Assets}, (2.14)$$

$$ROE = \frac{Net\ Income}{Total\ Equity}, (2.15)$$

Moving to market – based measures, we have chosen to use two measures. The first of them, Tobin's Q, is the most widely – used measure of financial performance, can be calculated in the following way:

$$Tobin's\ Q = \frac{Total\ market\ value}{Total\ assets}, (2.16)$$

Finally, in order to capture the expectations of current and potential investors, P/E ratio is used as the final measure of financial performance of a firm and is defined as:

$$P/E\ ratio = \frac{Price\ per\ share}{Earnings\ per\ share}, (2.17)$$

Control variables

Although the main goal of our research is to find and explain leverage – performance relationship, it is clear that there are some other factors, which could significantly influence companies' decision on capital structure. Thus, in our research we also take into account a number of independent variables, which help us isolate (*control*) for their effect on firm performance. For

the purpose of this study we follow Salim (2012) and Tifow et al. (2015) and control for size and growth, which showed to have a significant effect on financial performance.

We measure growth by annual percentage change in company's sales:

$$Growth = \frac{Sales_n - Sales_{n-1}}{Sales_{n-1}}, (2.18)$$

In order to calculate size of a firm, we take natural logarithm of its revenues:

$$Size = \ln(Sales), (2.19)$$

Determinants of capital structure

In accordance with the 6th hypothesis, devoted to analysing affects of potential determinants of capital structure, we calculate three measures in the following way:

$$Expected\ Growth = \frac{Market\ value\ per\ share}{Book\ value\ per\ share}, (2.20)$$

$$Size = \ln(Sales), (2.21)$$

Finally, *state of economy* is a dummy variable which is equal to 1 when the economic situation is stable (years 2010 – 2013) and 0 otherwise (years 2014 – 2015).

We summarize the variables that we use in the paper in the table 2.1 below:

Table 2.1 Classification of chosen variables

Type	Measure of	Based on	Variable	Name
Independent	Leverage	Accounting	Total debt to assets ratio	tdta
			Long – term debt to assets ratio	ltdta
			Total debt to assets ratio squared	tdta_sq
			Long – term debt to assets ratio squared	ltdta_sq
Dependent	Performance	Accounting	ROA	roa
			ROE	roe
		Market	Tobin's Q	tobin_q
			P/E ratio	per
Control	-	-	Growth	growth
			Size	size

2.4 Data description and sample selection

As far as objects for our analysis are Russian public companies, the first criteria for their choice is that they have to be listed at either Moscow Interbank Currency Exchange (MICEX) or Russian Trade System (RTS). Secondly, due to the differences in financial capabilities of banks, investment firms and insurance companies in comparison to manufacturing and services industries, they were deleted from the sample (Zeitun, 2009). Finally, we combined all firms into industry groups according to Standard Industry Classification (SIC).

In order to obtain the data we use Thomson Reuters Eikon database. In total we manage to obtain data on 135 companies, which represent 15 industries: Aerospace & Defence (*3%*), Automobiles & Parts (*3%*), Chemicals (*7%*), Construction & Materials (*2%*), Electricity (*34%*), Food Producers (*4%*), Gas & Water Multiutilities (*1%*), General Industrials (*1%*), Industrial Engineering (*4%*), Industrial Transportation (*4%*), Metals & Mining (*18%*), Oil & Gas (*9%*), Pharmaceuticals & Biotechnology (*3%*), Retail (*4%*), Telecommunications (*4%*). Companies which compose our sample are presented in ***Appendix 1.***

As we can notice, the distribution of firms chosen for the analysis reflects the dominant position of utilities and extraction industries. Table 2.2 below summarizes sample composition by industry.

Table 2.2 Sample composition by industry

Industry	**Companies**	***%***
Aerospace & Defence	4	3%
Automobiles & Parts	4	3%
Chemicals	9	7%
Construction & Materials	3	2%
Electricity	45	34%
Food Producers	5	4%
Gas & Water Multiutilities	2	1%
General Industrials	2	1%
Industrial Engineering	5	4%
Industrial Transportation	5	4%
Metals & Mining	25	18%
Oil & Gas	12	9%
Pharmaceuticals & Biotechnology	4	3%
Retail	5	4%
Telecommunications	5	4%
Total	135	100%

The period from 2010 to 2015 was chosen for the analysis for two reasons. First of all, companies' ability to attract debt and their performance is heavily affected by the state of economy. Thus, in order to avoid potential bias, we do not include years of recent financial crisis (2007 – 2008) as well as subsequent year 2009, which could also be influenced by economic downturn. Secondly, we do not include year 2016 because of the large share of missing values for observed variables.

2.5 Descriptive statistics and correlation matrix

In order to get a deeper insight on the data we are using, we provide descriptive statistics of all of our variables in Table 2.3 below:

Table 2.3 Descriptive statistics

Variable	Mean	Std. Dev	Min	Max
tdta	.292	.236	0	1.940
tdta_sq	.139	.255	0	3.765
ltdta	.149	.165	0	1.526
ltdta_sq	.049	.124	0	2.330
roa	.040	.115	-.718	.707
roe	.091	0.318	-1.991	2.444
tobin_q	1.895	7.191	0	87.030
pe	15.616	24.842	.044	210
growth	.114	.241	-1	2.060
size	3.378	1.840	1.001	8.712

Starting from measures of leverage, we see that the minimum value is zero, which indicates absence of debt in capital structure. However, in some firms there's almost two times higher amount of debt than assets (1.94). What is more, we see differences between means of total and long – term debt, which shows that there is a share of short – term debt in the balance sheet of some companies.

Moving to accounting – based performance, it's evident that it varies a lot from one firm to another. Thus, ROA's average value is 4.0%, which a more than two times smaller in comparison with average ROE of 9.1%, indicating healthiness of Russian firms.

As far as market – based performance is concerned, we can see a huge variation in P/E. Thus, while mean value is equal to very high level of 15.6, investors are paying from 0.044 up to 87 times for every dollar earned by a firm. As of Tobin's Q, we can see that it also ranges from a moderate 1.89 on average and up to 87 times, which tells us about high market capitalization of some compared to their assets.

Our control variable growth illustrates that while firms grow their sales on average with moderate paste of 11.4%, they can sometimes accelerate them more than twice compared to

previous year. Finally, size also shows how much firms differ from one to another, emphasizing the importance of including this control variable into the model specification.

Before we move to the final chapter of the paper where we describe the results of the models, it could be valuable to take a look at correlation matrix (refer Table 2.4) to get a quick sence of what those results could look like. Thus, we see a negative correlation between accounting – based perfomance measures and leverage, except for ROE and total debt ratio. However, when we turn to market – based indicators, there's no such a clear picture and correlation values are rather quite small.

Table 2.4 Correlation matrix

	tdta	**tdta_sq**	**lttda**	**lttda_sq**	**roa**	**roe**	**growth**	**size**	**tobin_q**	**pe**
tdta	1.000	-	-	-	-	-	-	-	-	-
tdta_sq	0.931	1.000	-	-	-	-	-	-	-	-
ltdta	0.685	0.639	1.000	-	-	-	-	-	-	-
ltdta_sq	0.650	0.707	0.921	1.000	-	-	-	-	-	-
roa	-0.259	-0.177	-0.141	-0.073	1.000	-	-	-	-	-
roe	0.091	0.141	-0.109	-0.035	0.039	1.000	-	-	-	-
growth	0.080	0.095	0.135	0.123	0.022	0.431	1.000	-	-	-
size	-0.065	-0.108	0.109	-0.060	0.052	0.028	0.236	1.000	-	-
tobin_q	0.047	-0.028	0.137	0.066	0.111	0.107	-0.005	-0.243	1.000	-
pe	0.030	-0.039	-0.022	0.002	-0.005	-0.299	-0.015	-0.139	-0.026	1.000

Summary of Chapter 2

In this chapter we start by defining clear hypotheses – they are what navigate the models we build, our tests and the variables we choose in order to obtain the result. Thus, we manage to address a number of critical issues. First of all, in our analysis we distinguish between total debt and long – term debt because of the different nature of various types of financing. What is more, in order to avoid potential biases which may arise due to industry specifics, we divide our sample into firms which operate in either heavy and light industry. Finally, we assume there's a possibility of nonlinear relationship between leverage and performance (according to trade – off theory) and address this question by including squared values of leverage. Summary of all hypotheses is provided in Table 2.5 below:

Table 2.5 Summary of hypotheses

H	Description
H_1	*The relationship between debt ratio and company's financial performance is negative*
H_2	*The relationship between long – term debt ratio and company's financial performance is negative*
H_3	*The relationship between leverage and company's financial performance in heavy industries is negative*
H_4	*The relationship between leverage and company's financial performance in light industries is negative*
H_5	*The relationship between leverage and company's financial performance is nonlinear*
H_{6a}	*The relationship between firm's size and debt ratio is positive*
H_{6b}	*The relationship between firm's expected growth and debt ratio is positive*
H_{6c}	*The relationship between state of economy and debt ratio is positive*

We then move to describing the methodology that we use in the paper. As far as we apply unbalanced panel data, there are three models, namely Pooled OLS, Fixed Effects and Random effects, which could be used. In order to understand which of them better fits our data and goals of the analysis, we provide a number of statistical tests, which help make this decision.

In the third part of the chapter we provide a calculation of the variables that we use for the research and also explain the rationale behind choosing each of them, referring to previous authors' papers.

As far as objects for our analysis are Russian public companies, the first criteria for their choice is that they have to be listed at either Moscow Interbank Currency Exchange (MICEX) or Russian Trade System (RTS). Secondly, due to the differences in financial capabilities of banks, investment firms and insurance companies in comparison to manufacturing and services industries, they were deleted from the sample (Zeitun, 2009). Finally, we combined all firms into industry groups according to Standard Industry Classification (SIC). In order to obtain the data we use Thomson Reuters Eikon database. In total we manage to obtain data on 135 companies, which represent 15 industries.

Finally, we get a quick sence of what the data looks like by providing descriptive statistics and correlation matrix of the variables.

CHAPTER 3. RESEARCH FINDINGS

The flow of this chapter followes the structure that we outline in the previous part of the paper. Thus, we begin with the models that we described and customize them for our hypotheses. After that we employ the tests to find best fitting estimators for each model. Finally, we outline managerial implications, describe the limitations and give suggestions for futher research.

3.1 Model findings

As we mention earlier, this final chapter starts with discussing the findings we obtain when testing the hypothesis.

***H_1**: The relationship between debt ratio and company's financial performance is negative*

As we can see from the table 3.1 which summarizes the findings of the hypothesis, there is evidence of negative relationship between accounting – based measures and performance. The results are consistent for all of the used models and are significant for both measures – ROA and ROE at 1 percent level. What is more, all of the used control variables also show to have a significant relationship with dependent variables.

Table 3.1 Relationship between debt ratio and accounting – based measures of performance

roa	**POLS**	**FE**	**RE**	**roe**	**POLS**	**FE**	**RE**
tdta	-.203*	-.320*	-.252*	*tdta*	-.301*	-.634*	-.419*
size	.004**	0.003	.004	*size*	.016*	.094*	.021
growth	.098*	0.712*	.084*	*growth*	.283*	.212*	.255*
_cons	.075*	.114*	.091*	*_cons*	.089*	-0.77	.105**
F – test	79.38*	70.44*		*F – test*	22.40*	22.20*	
R^2	0.23	0.22	0.23	R^2	0.19	0.16	0.18

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

As far as market – based performance is concerned, the results of regression show mixed results (refer Table 3.2). Thus, even though some models are significant for Tobin's Q according to F – test, as it is in case with OLS, main independent estimator – debt ratio – is only significant for Fixed Effects and Random Effects models. As for P/E ratio, results indicate absence of any significant relationship with debt ratio.

Table 3.2 Relationship between debt ratio and market – based measures of performance

tobin_q	**POLS**	**FE**	**RE**	**pe**	**POLS**	**FE**	**RE**
tdta	.461	-.327**	-.140*	*tdta*	1.551	-9.637	-6.165
size	-.906*	-1.948*	0.008**	*size*	-1.851*	-7.866***	-2.424*
growth	-.195	.849	.093*	*growth*	3.756	3.257	1.189
_cons	4.882*	9.420*	.8025***	*_cons*	21.56*	47.08*	26.583*
F – test	14.42*	5.29*		*F – test*	3.39**	1.52	
R^2	0.06	0.05	0.11	R^2	0.02	0.02	0.02

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

H₂: *The relationship between long – term debt and company's financial performance is negative*

Moving on to results of the second hypothesis, we can notice a similar pattern of results for long – term debt, as in case with the previous hypothesis. Thus, all of the models showed to be significant and indicate negative affect of long – term debt ratio on accounting measures at 1% level of significance (except for FE model, which is significant at 5% level).

Table 3.3 Relationship between long– term debt and accounting–based measures of performance

roa	**POLS**	**FE**	**RE**	**roe**	**POLS**	**FE**	**RE**
ltdta	-.159*	-.119*	-.252*	*ltdta*	-.420*	-.264**	-.327*
size	.007*	0.001	.004	*size*	.023*	.054	.026*
growth	.097*	0.092*	.084*	*growth*	.282*	.236*	.261*
_cons	.026*	.052	.091*	*_cons*	.044***	-0.81	.022
F – test	31.06*	17.01*		*F – test*	23.58*	11.13*	
R^2	0.11	0.09	0.23	R^2	0.09	0.06	0.09

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

As far as relationship between long – term debt ratio and market measures of financial performance is concerned (refer Table 3.4), the findings differ from those of accounging measures tremendously. Thus, only 2 models, OLS and FE, turned out to be significant for Tobin's Q. They indicate of a negative influence of long – term debt ratio on 5% and 10% level respectively. At the same time, no conclusions can be made based on results for P/E ratio, because no significant relationship was found.

Table 3.4 Relationship between long – term debt and market – based measures of performance

tobin_q	**POLS**	**FE**	**RE**	**pe**	**POLS**	**FE**	**RE**
ltdta	-.0754*	-.2956**	.313	*ltdta*	-.979	-.3243	-.154
size	-.880*	-1.754**	-.911*	*size*	-1.823*	-7.546	-2.112**
growth	-1.193	.636	.288	*growth*	2.548	1.732	-.373
_cons	3.791*	8.075*	4.862*	*_cons*	21.977*	47.69*	25.863*
F – test	22.99*	3.44**		*F – test*	2.99	2.45	
R^2	0.09	0.04	0.05	R^2	0.02	0.02	0.01

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

H₃: *The relationship between leverage and company's financial performance in heavy industries is negative*

Proceeding to subsample consisting of companies which operate in heavy industries, a number of interesting insights can be drawn (refer Table 3.5). First of all, similarly to results for overall sample, there turned out to be a significant negative relationship between debt ratio and accounting – based performance measured. What is more, results are consistent for all of the models for both ROA and ROE at 1 percent significance level.

Table 3.5 Relationship between debt ratio and accounting – based measures of performance in heavy industries

roa	**POLS**	**FE**	**RE**	**roe**	**POLS**	**FE**	**RE**
tdta	-.193*	-.292*	-.229*	*tdta*	-.301*	-.649*	-.413*
size	.002	0.006	.002	*size*	.011	.082	.015
growth	.109*	0.838*	.095*	*growth*	.279*	.206*	.253*
_cons	.075*	.138*	.089*	*_cons*	.106*	-0.28	.129**
F – test	58.97*	46.11*		*F – test*	16.96*	18.97*	
R^2	0.21	0.18	0.20	R^2	0.08	0.05	0.07

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Now turning to results for market – based measures, which are presented in Table 3.6 below, results don't give a clear picture on which conclusions can be drawn. As it turned out, there is no significant evidence in of any type of relationship between P/E and debt ratio. However, as far as Tobin's Q is concerned, Fixed Effects and Random Effects models are both significant at 5% level and a conclusion about its negative relationship with leverage can be drawn.

Table 3.6 Relationship between debt ratio and market – based measures of performance in heavy industries

tobin_q	**POLS**	**FE**	**RE**	**pe**	**POLS**	**FE**	**RE**
tdta	-.149	-.373**	-.279**	*tdta*	-.174	-12.918	-7.878
size	-1.076*	-2.050**	-1.196*	*size*	-2.034*	-3.453	-2.466**
growth	-.292	.636	.853	*growth*	1.372	2.498	.122
_cons	5.789*	1.083*	6.855*	*_cons*	22.677*	31.208	27.289*
F – test	24.88*	5.00*		*F – test*	3.49**	0.63	
R^2	0.02	0.06	0.06	R^2	0.02	0.02	0.02

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

***H_4**: The relationship between leverage and company's financial performance in light industries is negative*

Having obtained results for debt ratio – accounting performance relationship we can notice (refer Table 3.7) that results are quite similar. There is, again, evidence supporting negative relationship between ROA and leverage and results are same for all models at 1% significance level. However, when ROE serves as dependent variable, only OLS model turns out to show significant results.

Table 3.7 Relationship between debt ratio and accounting – based measures of performance in light industries

roa	**POLS**	**FE**	**RE**	**roe**	**POLS**	**FE**	**RE**
tdta	-.274*	-.462*	-.422*	*tdta*	-.423*	-.029	-.370
size	.017*	0.011	.019**	*size*	.050*	.211*	.072**
growth	.027	0.008	.000	*growth*	.309***	.292**	.312*
_cons	.060*	.132	.093**	*_cons*	.002	-1.208**	.-102
F – test	28.76*	73.21*		*F – test*	7.77*	5.12*	
R^2	0.46	0.28	0.45	R^2	0.19	0.10	0.18

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Surprisingly, when we test the same hypothesis for market – based measures, none of the estimators for either Tobin's Q or P/E ratio shows to be significant. Thus, we can conclude there's no influence of debt ratio on market – based measures for companies operating in light industries.

Table 3.8 Relationship between debt ratio and market – based measures of performance in light industries

tobin_q	**POLS**	**FE**	**RE**	**pe**	**POLS**	**FE**	**RE**
tdta	-.167	-.321	-.062	*tdta*	9.428	-17.519	14.911
size	-.123*	-.487*	.028	*size*	1.496	-24.954*	-3.962
growth	-.330	.162	.173	*growth*	1.372	2.205	18.067
_cons	.219	2.287*	.484***	*_cons*	36.703	18.306	26.062**
F – test	5.84*	3.70**		*F – test*	1.23	3.64**	
R^2	0.02	0.11	0.12	R^2	0.05	0.00	0.02

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

H*$_5$: The relationship between leverage and company's financial performance is nonlinear***

Up to this moment all of the models evaluted linear relationship between performance and leverage. However, as we explain in the previous chapter, we also assume there's a possibilty of nonlinear relationship and include squared debt ratio term to account for this. As it turns out (refer Table 3.9) there is in fact significant affect of debt ratio on both ROA and ROE. What is more, the result can be applied for all models at 1% significance level.

Table 3.9 Relationship between debt ratio and market – accounting measures of performance

roa	**POLS**	**FE**	**RE**	**roe**	**POLS**	**FE**	**RE**
tdta_sq	-.188*	-.223*	-.208*	*tdta_sq*	-.455*	-.608*	-.590*
size	.003***	-.019	.003	*size*	.015**	.074***	.019***
growth	.086*	0.069*	.073	*growth*	.280*	.212*	.251*
_cons	.044*	.126*	.051*	*_cons*	.061***	-.094	.066
F – test	80.09*	74.83*		*F – test*	22.40*	23.04*	
R^2	0.24	0.15	0.23	R^2	0.08	0.06	0.08

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Finally, when looking at results for market – based measures in Table 3.10, they indicate absence of any significant relationship with debt ratio. Even though some of the models (POLS and FE for Tobin's Q and POLS for P/E) are significant at different levels according to F – test, the main independent variable, debt ratio, is significant for none of them. Thus, we cannot make any conclusions on nonlinear relationship between debt ratio and market – based performance.

Table 3.10 Relationship between debt ratio and market – market measures of performance

tobin_q	**POLS**	**FE**	**RE**	**pe**	**POLS**	**FE**	**RE**
tdta_sq	-.467	-1.251	-1.041	*tdta_sq*	.279	-3.055	-6.299
size	-.921*	-2.132*	-1.023*	*size*	-1.860*	-8.354	-2.439*
growth	-.263	.972	.683	*growth*	3.825	3.439	1.167
_cons	.219*	9.249*	5.368*	*_cons*	21.944*	46.800*	25.713*
F – test	14.43*	3.96*		*F – test*	3.37**	1.33	
R^2	0.06	0.06	0.05	R^2	0.02	0.02	0.02

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

***H_{6a}**: The relationship between size and debt ratio is positive*

***H_{6b}**: The relationship between expected growth and debt ratio is positive*

***H_{6c}**: The relationship between state of economy and debt ratio is positive*

Having tested a number of hypotheses evaluating leverage – performance relationship for subsamples based on different companies' characteristics, we move to the final one. Here we try to check, what characteristics could serve as determinants of capital structure decisions for Russian companies. According to results that we summarize in Table 3.11 below, all of the chosen characteristics (size, expected growth, state of economy) turn out to have significant influence on debt ratio at 1% level of significance. Apart from that, we also indicate that Random Effects is the best fitting estimator for all of the three characteristics.

Table 3.11 Determinants of capital structure

	Size	**Expected Growth**	**State of Economy**
tdta	.015*	.101*	.062*
_cons	.342*	.153*	.344*
F – test	9.96*	7.12*	12.45*
R^2	0.05	0.09	0.07
Best fitting model	RE	RE	RE

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

All in all, results for the tested hypotheses are contradicting. Thus, following the methodology we lay out in the second chapter of the paper, we are going to use a set of tests to find out which models are the best for each particular hypothesis. In order to remind the reader how the decision on the most appropriate estimator is made, we once again provide null and alternative hypotheses for the tests. We summarize our findings in table 3.12 below.

F-test

H_0: *Pooled OLS model*

H_1: *Fixed effects model*

Breusch – Pagan LM test

H_0: *Pooled OLS model*

H_1: *Random effects model*

Hausman test

H_0: *Random effects model*

H_1: *Fixed effects model*

Table 3.12 Summary of tests

Hypothesis	Measure	Test			
		F	**Breusch – Pagan LM**	**Hausman**	**Best Fitting Model**
H_1	ROA	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	ROE	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	Tobin's Q	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	PE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
H_2	ROA	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
	ROE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
	Tobin's Q	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	PE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
H_3	ROA	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	ROE	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	Tobin's Q	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
	PE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
H_4	ROA	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	ROE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
	Tobin's Q	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	PE	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
H_5	ROA	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	ROE	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	Tobin's Q	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
	PE	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects
H_6	Size	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	Expected Growth	H_0 Rejected	H_0 Rejected	H_0 Rejected	Fixed Effects
	State of Economy	H_0 Rejected	H_0 Rejected	H_0 Accepted	Random Effects

Now that we have gathered findings and found best models for each of the hypotheses we are ready to move to the next part of the chapter, where we will discuss the obtained results.

3.2 Results and discussion

In this section we follow the structure that we outline in the previous part of the chapter, analysing results separately for each hypothesis separately. In the end of the section we present a table which summarizes the results.

***H_1**: The relationship between debt ratio and company's financial performance is negative*

First of all, we reject the hypothesis for both accounting- and market – based measures of financial performance. Starting with accounting measures, Fixed Effects model turned out to be best fitting estimator for both ROA and ROE. Secondly, significant negative relationship between the variables is found. Thus, one unit increase in debt ratio causes a decrease of 0.32 and 0.64 correspondingly. Finally, we can observe a pretty high value of R^2 (0.22/016), which indicates fraction of total variance explained by the model.

Moving to market – based measures, we can observe a similar pattern: there's evidence of negative relationship with the debt ratio. However, while the relationship is significant when Tobin's Q is used, same cannot be applied for P/E ratio. Thus, inferences can be made only on the first measure and we can make the following conclusion: one unit increase in debt ratio leads to a decrease of 0.33. While the best model according to the tests is Fixed Effects as in case with accounting measured, R^2 in this case is much smaller and is equal to 0.05.

Reflecting on the results of the first hypothesis test, it is fair to say that they are quite expected. Thus, they are consistent with findings of Iavorskiy (2013) whose study is devoted to Ukrainian companies, which operate in a similar to Russian conditions as well as with findings of Ghosh (2008) who analyzed Indian companies, which similarly to Russia represents emerging market.

***H_2**: The relationship between long – term debt and company's financial performance is negative*

Starting with accounting – based measures, we see presence of significant negative relationship with long – term debt. According to results of Random Effects model, which showed to be the most preferable among others, 1% increase in long – term debt ratio is followed by a decrease of 0.26 and 0.33 for ROA and ROE accordingly. R^2 indicates that model accounts for 23% of variance in ROA and 6% of variance in ROE.

As far as market measures of performance are concerned, results are very similar to those obtained with analysis of debt ratio. Thus, there's again no significant evidence of impact of higher leverage on P/E ratio, while there is significant result at 5 percent level for Tobin's Q. Results of the best fitting estimator (in this case Fixed Effects) can be interpreted as follows: whenever long – term ratio is increased by 1 unit, it causes a decrease of 0.29 in Tobin's Q. R - squared of 0.04

means that total variance in Tobin's Q for companies which comprise the sample is explained by the model by 4%.

Though we point out many times in our study the contradicting results of the direction of relationship between leverage and firm performance, our results for both debt and long – term debt rato are very similar. Abor (2005) also revealed negative impact of leverage on performance in Indian market suggested that an explanation to that were high interest rates. Iavorskiy (2013) and Ilyukhin (2015) obtained similar results for Ukrainian and Russian firms respectively and connect it with inefficiency of debt capital markets which create difficulties for attracting debt and lead to higher interest rates.

***H_3**: The relationship between leverage and company's financial performance in heavy industries is negative*

Starting with accounting measures, Fixed Effects showed to be the best fitting model for these indicators. ROA and ROE are again negativvely affected by higher leverage, measured by debt ratio, and results are significant at 1 percent level. R – squared of 18% for ROA and 5% for ROE indicates how much of the variance in these ratios is explained by the model.

As for market – based indicators, while P/E is not significantly influenced by higher level of indebtedness, Tobin's Q dicreases by 0.37 whenever debt ratio is increased by 1 point. Though the model is significant at 5% level, R^2 is quite low and is equal to 0.06.

Commenting on the findings of the model for companies operating in heavy industries, we are not surprised to observe negative leverage – performance relationship, because these firms represent a large share of the overall sample, where a similar pattern was present. Iavorskiy (2013) revealed significant negative effect of long – term leverage on Ukrainian firms' performance in Energy, Mining, Construction, and Manufacturing industries. In one of the recent researches by Dwilaksono (2016) similar results were obtained by analyzing Indonesian mining companies.

***H_4**: The relationship between leverage and company's financial performance in light industries is negative*

We already outlined the rationale of creating subsamples in order to account for differing driving forces of heavy and light industries in the second chapter of the paper. However, based on the results of our models, the direction of leverage – performance relationship is the same. Thus, ROA showed to be negatively affected by higher debt with a coefficient of 0.46, while model for ROE found no significance.

At the same time, market – based measures, either Tobin's Q or P/E ratio is not significantly affected by any movement in debt ratio.

Zeitun, Tian (2007) and Ahmed (2015) both analyzed Australian market and found evidence of negative affect of increased leverage on performance in service – sector companies. Apart from that, Zeitun and Tian found support for a well - known statement «size matters»: their results indicate that size positively affects companies' performance, because of lower associated bankruptcy costs.

***H_5**: The relationship between leverage and company's financial performance is nonlinear*

First of all, we do not reject the hypothesis about presence of nonlinear relationship between leverage, measured as squared value of debt ratio and financial performance. When we use accounting – based measures of performance, Fixed Effects model is the best fitting one for both ROA and ROE. The result of the models can be interpreted as follows: 1 unit increase in debt ratio leads to a corresponding decrease of 0.22 in return on assets. ROE is even more responsive to change in leverage and is decreased with coefficitent of 0.61 in response to 1 unit increase in debt ratio.

However, when we look at market – based measures, results indicate that there's no significant influence of debt ratio on either of the two measures of performance.

That being said, we need to stress the fact that we've already found evidence of significant relationship between the two variables for linear specification as well. Thus, in order to find which model should be prefered, we use *Akaike Information Criterion (AIC)*. The decision rule is simple: the model with a lower (absolute) value of AIC is said to be of a higher quality for a given set of data. We provide the results of AIC indicator for the two models in Table 3.13 below.

Table 3.13 Results of Akaike Information Criterion

Leverage measure	**Performance measure**	**AIC**
tdta	ROA	-1359.453
	ROE	345.587
tdta_sq	ROA	-1361.085
	ROE	344.604

As one can notice, for both accounting measures, which showed to be significant, non – linear model specification is preferable to a linear one, based on results of Akaike Information Criterion. Our findings lead us to conclusion about the presence of inverted U – shape relationship between leverage and financial performance. Thus, there's a point at which marginal utility starts diminishing and destroys value for companies – this findings are consistent with Trade – Off theory.

Reflecting on the findings of ***H_5***, we can say that they are similar to those, found by some other authors. Thus, Jang and Tang (2009) studied effect of diversification and leverage of corporate

performance. According to their results, while diversification showed to be a useful tool for improving profitability, impact of leverage on financial returns is found to be limited by an optimal point, after which results are negatively affected. Interestingly, though findings of Iavorsky suggest a similar pattern for some measures (ROA and Total Factor Productivity), no significant relationship is found when EBIT margin is used as a measure of performance.

***H_{6a}**: The relationship between size and debt ratio is positive*
***H_{6b}**: The relationship between expected growth and debt ratio is positive*
***H_{6c}**: The relationship between state of economy and debt ratio is positive*

We are finally moving to our final hypothesis related to determinants of capital structure. As far as this question is not directly related to the goal of our research, we just briefly describe the results we get. All of the three firm charactiristics positively affect leverage, measured as debt ratio, and are significant at 1 percent level.

Suchwise, the larger the firm, the higher (on average) is its debt ratio, which is consistent with findings of some scholars (Son (2005), Karadeniz (2011). They explain it by the lower probability of default for larger firms and, therefore, increased willingness of those firms to enjoy benefits of debt.

As for the next characteristic - expected growth -, we again observe positive significant relationship, which is not surprising. Thus, most of the authors, who obtain similar result in their researches, interpret it in a very simple way: whenever companies (and investors, which is reflected in Market – to Book value) anticipate good prospects for their businesses, they are willingly attracting higher amount of debt, because they are sure in their capability to pay it back in the future.

Finally, same logic as an case with expected growth can be applied to state of economy as determinant of capital structure: if the economy is in good state, firms are much more intended to have higher level of indebtedness.

As one can notice, despite contradictions found in many researches that we analyzed on the type of leverage – performance relationship, results for Russian market are much clearer. Though some measures of performance are not significantly affected by leverage, there's no contradiction for all of the others: higher indebtdedness of a company leads to worse financial performance. At the same time, our analysis reveals 3 characteristics, all of which have significant positive impact on leverage (measured as debt ratio). In the next part of this chapter we will explain how these results can be interpreted and used by both - investors and company managers. Results of tests of all hypotheses are summarized in table 3.14 below.

Table 3.14 Summary of tested hypotheses

Hypothesis	Measure	Relationship
H_1	ROA	Neagtive
	ROE	Negative
	Tobin's Q	Negative
	PE	-
H_2	ROA	Negative
	ROE	Negative
	Tobin's Q	Negative
	PE	-
H_3	ROA	Negative
	ROE	Negative
	Tobin's Q	Negative
	PE	-
H_4	ROA	Negative
	ROE	-
	Tobin's Q	-
	PE	-
H_5	ROA	Negative
	ROE	Negative
	Tobin's Q	-
	PE	-
H_6	Size	Positive
	Expected Growth	Positive
	State of Economy	Positive

3.3 Managerial implications

Having discussed results of our hypotheses testing, in this next section of our research we are going to outline how the results should be interpreted from a business prospective. Needless to say, this part is probably the most valuable in the entire paper, as far as it brings a set of useful insights, which could be used by both «sides of the table» - companies' managers and investors.

First of all, we once again stress the importance of capital structure decisions for success of any modern firm. We see a very clear evidence of negative impact of leverage in its different forms on firm performance of a company, independently from its individual characteristics and industries it operates in. Despite this fact, size of a firm, its growth expectation and stable state of economy all turned our to be significant determinants, positively affecting willingness to attract higher amount of debt. Thus, inspite of potential gains received from leverage, both – managers and investors – should be aware of negative effects it could ultimately bring and adapt their strategy in response.

What is more, our results support an argument if favor of presence of inverse U – shape relationship between leverage and financial performance. The finding is consistent with a well - known Trade – Off theory of Kraus and Litzenberger (1973) and reveal a diminishing utility of leverage for a company. The implication of this finding is especially crucial for Russian companies, which operate in an extremely volatile environment. Taking into account positive impact of some characteristics on leverage, it's critical for Russian firms to have effective processes for corporate control and budget limits. On the other hand, existing and prospective shareowners should adapt their investment strategies accordingly, thouroghly evaluating credit risk of the target.

Finally, our results are of a great importance in current business Russian landscape. Thus, economic sanctions of Western countries put enormous pressure on competitiveness of domestic companies by limiting access to debt capital markets and narrowing export routes. Therefore, managers should be extremely careful when evaluating investment opportunities and choosing debt – equity mix, which could significantly influence performance of the firm.

3.3.1 Case studies

Though up to this moment we have covered all research objectives of the study, we decided to add specific examples illustrating the obtained results. In order to do that, we have chosen 5 companies, leaders of their industries, and apply time – series regression analysis to investigate company – specific relationship between leverage and financial performance. We used three criteria to choose the firms for analysis. First of all, as it is mentioned earlier, they have to be industry leaders. Secondly, they have to operate in the very same industry. Thirdly, they have to represent both – heavy and light part of the sample. As a result, 3 firms representing heavy industries (Oil & Gas) and 2 firms from light industries (Food Retail) were chosen:

1. Rosneft
2. Gazprom
3. Lukoil
4. Magnit
5. Dixy

Further we provide the obtained results, following the approach we used for our previous analyses, starting with results of regression and then interpreting them.

Table 3.15 Time – series regression results for Rosneft

Rosneft

	ROA	**ROE**	**Tobin's Q**	**P/E**
tdta	-.552*	-.334	-.371*	-4.314
_cons	.226*	.256	.158*	7.686
R^2	0.83	0.33	0.89	0.07
tdta_sq	-.916*	-.593	-.624*	-7.236
_cons	.146	.211	1.043	7.066
R^2	0.80	0.37	0.89	0.06
ltdta	-.996	-.718	-.618***	-4.313
_cons	.278	.314	1.806**	7.686
R^2	0.67	0.34	0.66	0.07

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Starting with the first variable – ROA – we can see that despite a short period of observations (we use the same data from 2010 to 2015 in order to avoid time bias), we can observe very high R – squared, which is indicative of high goodness of fit of the models. However, only two of three models are statistically significant (both – at 1% significance level). Moving to Return on Equity, none of the models turned out to be significant, indicating absence of relationship between chosen measures of leverage and performance, and same holds for P/E ratio. As for Tobin's Q, it showed to be significantly affected by all three measures of leverage, which goes in line with high value of R – squared.

Table 3.16 Time – series regression results for Gazprom

Gazprom

	ROA	**ROE**	**Tobin's Q**	**P/E**
tdta	-1.209***	-1.683	-2.128	95.658
_cons	.272	.384	.626	-8.766
R^2	0.56	0.53	0.28***	0.19
tdta_sq	-3.634	-5.052	-6.969	267.524
_cons	.174	.249**	.462**	-.571
R^2	0.55	0.52	0.30	0.16
ltdta	-1.473***	-2.049	-2.189	122.223
_cons	.269**	.381**	.572***	-9.300
R^2	0.62	0.58	0.22	0.24

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Moving to the next company, Gazprom, we again find evidence of significant relationship between leverage and financial performance for ROA (except for second model, which uses squared value of debt ratio). Interestingly, none of the rest models turned out to be significant, which is quite consistent with findings for Rosneft.

Table 3.17 Time – series regression results for Lukoil

Lukoil

	ROA	**ROE**	**Tobin's Q**	**P/E**
tdta	-.377	-.309	-1.279***	1.440
_cons	.128**	.167	.645*	4.899**
R^2	0.35	0.28**	0.54	0.01
tdta_sq	-1.705	-1.196	-5.178	4.434
_cons	.110*	.149	.574*	5.002*
R^2	0.47	0.27*	0.57	0.00
ltdta	-.475***	-.378	-1.448*	3.168
_cons	.127**	.169*	.623*	4.705
R^2	0.59	0.36	0.90	0.02

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

The last company representing heavy industries is Lukoil. Reflecting on the results of regression, we find evidence of significant relationship between long – term debt ratio and ROA. As for the rest models, only Tobin's Q is affected by leverage, measured by debt ratio and long – term debt ratio at 10% and 1% significance level respectively, while other models are not significant.

Table 3.18 Time – series regression results for Magnit

Magnit

	ROA	**ROE**	**Tobin's Q**	**P/E**
tdta	.378	-4.626	-37.588	-72.452
_cons	.026	1.592	12.966***	42.725
R^2	0.84	0.84	0.50	0.02
tdta_sq	.629	.628	-69.136	-140.99
_cons	.083	.083	7.869**	33.500
R^2	0.84	0.84	0.52	0.02
ltdta	-.221*	-1.264**	-11.250	-3.902
_cons	.184*	.517*	4.292*	20.617**
R^2	0.99	0.85	0.77	0.00

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Moving to companies operating in light industries, on example of Magnit, which is one of the biggest and undoubtedly fastest growing food retail chain in recent years, we can see that only two measures of financial performance – ROA and ROE – are influenced by leverage (measured as long – term debt ratio). As one can notice, these two models are characterized by extremely high values of R – squared (0.99 and 0.85 respectively). It's critical to stress once again that through all models that we test we find much weaker evidence of relationship between market measures of performance and leverage measures (compared to accounting – based), which is explained by many authors by low liquidity of financial markets in emerging countries.

Table 3.19 Time – series regression results for Dixy

Dixy

	ROA	**ROE**	**Tobin's Q**	**P/E**
tdta	-.332	-.847	9.034	970.46
_cons	.145	.379	-2.538	-299.06
R^2	0.36	0.30	0.59	0.53
tdta_sq	-.452	-1.152	12.761	1361.56
_cons	.084	.224	-.951	-127.37
R^2	0.35	0.29	0.61	0.54
ltdta	.058	.173	.248	-60.593
_cons	.009	.027	.639	66.268
R^2	0.05	0.66	0.00	0.00

*** $p < 0.10$, ** $p < 0.05$, * $p < 0.01$

Finally, results of regression for our last company – Dixy – revealed no significant leverage – financial performance relationship for any of the measures.

Despite the fact that the obtained results might seem not very insightful due to a low number of significant models and a limited set of companies chosen for analysis, still a number of interesting conclusions can be drawn. Most importantly, among the models, which turned to be significant, we find evidence of negative impact of leverage on financial performance, which is consistent with the findings for the panel data.

Furthermore, impact of leverage on accounting – based measured is present much more often compared to market – based analogues. Interestingly, P/E ratio isn't significantly affected by capital structure decisions – these two findings are again consistent with previous results.

Finally, we see that results of time – series regression are very similar to those found for panel data. Thus, three measures of financial performance (except for P/E) are influenced by leverage for chosen firms representing heavy industries (Rosneft, Gazprom, Lukoil), which is consistent with results of H_3 (refer Table 3.14). At the same time, findings for Magnit and Dixy are also similar to those for the overall sample (H_4, refer Table 3.14), indicating that ROA is the only performance measure influenced by leverage.

Summarizing, we can say that company – specific findings are consistent with panel data results, indicating that industry leaders follow same leverage – performance relationship as the overall trend for all companies.

3.4 Limitatons and suggestions for further research

Though our results could serve as a highly valuable instrument for decision – making, they can only be used along with a number of assumptions – limitations of the study.

First of all, our analysis is devoted to one region, Russia, over a specified period of time (2010 – 2015). Even though our findings are similar to those of some other scholars, they cannot be fully extrapolated to other countires. Thus, a potential area which could be researched is to find out how comparable the results are to other emerging markets and how they evolve over time.

Another limitation for our study is the variables that we use. As we show in the literature review part, there's a huge variety of indicators that could be used as measures of leverage and performance. Although the results of our analysis are consistent across all measures that we use, it's still interesting how they could change if other variables were chose. Thus, ROI, ROCE, ROIC (among others) could be used as measures of accounting – based performance, while Market Value Added, Dividend Yield or Payout Ratio (among others) could be applied for market measures. On the other hand, there's also a set of measures which could be used for leverage, such as Debt – to Equity, Interest Coverage ratio, CF to debt and others.

Next limitation is related to hypotheses 3 and 4. In our research we divide our sample into those firms, who operate in heavy industries and and those in light and there's rationale behind this decision: there are not enough companies representing some industries to make cross – industrial conclusions. In this regard, it could be interesting to compare results obtained in some industries in Russian market versus other developing countries.

Finally, as it comes from the name of the topic, the object of our study are only public firms. Thus, it could also be useful to look at private firms and compare results of the two models to get additional valuable insights.

Summary of Chapter 3

In this last chapter of the thesis we provide findings of the models that we outline in methodological part. Apart from that, we give our reflections on the obtained results and suggest how they could be used by decision – makers.

Not surprisingly, not all of the models turned out to be significant. Thus, we can mention that impact of leverage on accounting – based measured is present much more often compared to market – based analogues. Interestingly, P/E ratio isn't significantly affected by capital structure decisions in any of the hypotheses.

Despite contradictions found in many researches that we analyzed on the type of leverage – performance relationship, results for Russian market are much clearer. Though some measures of performance are not significantly affected by leverage, there's no contradiction for all of the others: higher indebtdedness of a company leads to worse financial performance.

Furthermore, based on our results, we can make a set of managerial implications:

- Both - managers and investors - should be aware of negative effects leverage could ultimately bring and should adapt their strategies in response;
- Existing and prospective shareowners should thoroughly evaluate credit risk of the target company, which operate in a volatile business environment;

- Size, expected growth and state of economy have significant positive effect on leverage, thus it is essential to have realistic forecasts and adjust debt – equity mix accordingly;
- It is critical to have effective processes for corporate control and budget limits to optimize capital structure decisions, especially in period of sanctions and economic stagnation.

Apart from the above mentioned recommendations it is vital to state that we found that among 5 industry leaders representing 2 sectors from both heavy and light industries (Oil & Gas and Food Retail), firms were found to follow same direction of leverage – financial performance relationship as the overall trend for all companies.

Finally, there is a number of limitations, in turn to which we provide the following suggestions for further research: explore other emerging markets and compare the results; include new indicators for measuring leverage and performance; evaluate impact of leverage on financial results within same industries across different regions; investigate leverage – performance relationship for private companies.

CONCLUSION

The research goal of the thesis is to determine the relationship between capital structure and firm financial performance, using evidence of Russian public companies. In order to achieve the goal we set a number of research objectives, all of which were successfully accomplished.

Reviewing the literature, we find out that there is no concensus on type of relationship between capital structure and firm's financial performance Moreover, there is no single position on which measures of leverage and financial performance should be used. As we move to second part, we define the hypotheses, outline methodology that we use to test them and build the sample of Russian public companies which we use as the object for analysis. Finally, we find evidence of significant relationship between some performance measures and leverage.

According to our results, leverage is found to negatively influence firm performance when the entire sample of companies is analyzed. The only measure of performance which shows no significant relationship with leverage is P/E ratio. Moving to long – term debt ratio, we obtain the same results as in case with debt ratio: higher indebtedness leads to worse financial results.

Moving to analysis of industry subsamles, we again see evidence of significant negative effect of leverage on ROA, ROE and Tobin's Q for companies operating in heavy industries. However, when analysing light industry only ROA turned out to be significantly affected by debt ratio.

Finally, our findings lead us to conclusion about the presence of inverted U – shape relationship between leverage and financial performance. Thus, there's a point at which marginal utility starts diminishing and destroys value for companies – this finding is consistent with trade – off theory.

Apart from that, we revealed three determinants of capital structure– size, expected growth, state of economy–,all of which have significant positive effect on leverage of Russian companies.

Based on we can make a set of managerial implications, which could benefit managers and investors. First of all, both sides should be aware of negative effects leverage can cause; secondly, existing and prospective shareowners should thoroughly evaluate credit risk of the target company; what is more, it is essential to have realistic forecasts about company's and economic prospects and adjust debt – equity mix accordingly; finally, effective processes for corporate control and budget limits should be implemented in order to optimize capital structure decisions.

Although our study is coherent and some of our recommendations might seem obvious, obtained results could be valuable for decision makers as well as for further research. Thus, we suggest potential areas, which could be further explored by scholars. Including other variables and comparing the results is the first direction. Apart from that, similar research on other emerging markets could be conducted and then results could be compared. What is more, another promising topic could be looking at private firms and find out how the results differ from ours.

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APPENDIX

Appendix 1. Sample composition

№	Company
1	Irkut
2	Motivilicha Plants
3	RSC Energia
4	United Aircraft Corporation
5	Avtovaz
6	Nizhnekamskshina
7	Omskshina
8	Sollers
9	Acron
10	Dorogobuzh
11	Kazanorgsintez
12	Khimprom
13	Kuibyshevazot BRD
14	Mashinostroitelny Zavod
15	Nizhnekamskneftekhim
16	Uralkali
17	Vladimir Chemical Plant
18	LSR Group
19	Mostotrest
20	PIK Group
21	Astrakhan Energy Retail
22	Energosbyt Rostovenergo
23	Far Eastern Energy
24	Federal Grid Company of Unified Energy System
25	Idgc of Center and Volga Region
26	Idgc of Centre
27	Idgc of North-West
28	Idgc of Siberia
29	Idgc of Urals
30	Idgc of Volga
31	Inter RAO UES
32	Irkutskenergo
33	Kaluga Retail
34	Kamchatskenergo
35	Kostroma Retail
36	Krasnoyarsk Hydropower Station
37	Krasnoyarskenergosbyt
38	Kubanenergo
39	Kubanenergosbyt
40	Lenenergo
41	Lipetsk Energy Retail Company
42	Mordovia Energy Distributing
43	Moscow Integrated Electricity Distribution
44	Mosenergo

45	Murmanskaya CHPP
46	Nizhny Novgorod Retail Company
47	OJSC Enel OGK-5
48	Perm Energy Distributing Company
49	Quadra Power Generation
50	RAO Energy System of East
51	Rosseti
52	Rushydro
53	Samaraenergo
54	Saratovenergo
55	Stavropolenergosbyt
56	Sverdlovenergosbyt
57	Territorial Generating Company No1
58	Territorial Generating Company No2
59	TGC-14
60	TNS Energo Yaroslavl
61	Tomsk Distributing
62	Unipro
63	Volgogradenergosbyt
64	Vologda Retail Company
65	Yakutsenergo
66	Cherkizovo Group
67	JSC Kubanskaya Steppe
68	Ostankinsky Meat Processing Enterprise
69	Red October Confectionary
70	Rusgreyn Holding
71	Gazprom Gazor Rostov-NA
72	Gaz-Service
73	Institute of Human Stem Cells
74	Kovrov Mechanical Plant
75	AMO ZIL
76	Kamaz
77	OMZ Uralmash Izhora Group
78	Tantal
79	Tuimazinskiy Zavod Autobetonovozov
80	Far Eastern Shipping
81	North-Western River Shipping
82	Novorossiysk Commercial Sea Port
83	Trans Container
84	Utair
85	Alrosa-Nyurba
86	Ashinsk Metkiy Zavod
87	Belon
88	Chelyabinsk Tube Rolling Plant
89	Chelyabinsk Zinc Plant
90	Electrozinc

91	JSC Lenzoloto
92	Korshynov Mining Plant
93	Kosaya Gora Iron Works
94	Magnitogorsk Iron and Steel Works
95	Mechel OAO
96	MMC Norilsk Nickel
97	Novolipetsk Steel
98	Polyus
99	Raspadskaya
100	Ruspolimet
101	Seligdar
102	Severstal
103	Solikamsk Magnesium
104	Southern Kuzbass Coal Company
105	Sredneuralsky Copper Smelting Plant
106	TMK OAO
107	Uralkuz
108	Vsmpo
109	Yuzhuralnickel
110	Bashneft
111	Gazprom
112	Gazprom Neft
113	Moscow Oil Refinery
114	Novatek
115	OC Rosneft
116	Oil Company Lukoil
117	RN Holding
118	Slavneft Megionneftegaz
119	Slavneft-Yarosl
120	Surgutneftegas
121	Tatneft
122	Farmsintez
123	Pharmstandard
124	Protek
125	Veropharm
126	Dixy Group
127	M Video
128	Magnit
129	Pharmacy Chain 36.6
130	Trade House Tsum
131	Bashinformsvyaz
132	Mobile Telesystems
133	Moscow City Telephone
134	Rostelecom
135	Tattelecom